DOE-ID NEPA CX DETERMINATION

CX Posting No.: DOE-ID-16-088

SECTION A. Project Title: Sodium-Cooled Fast Reactor Key Modeling and Analysis for Commercial Deployment – University of Wisconsin

SECTION B. Project Description

The University of Wisconsin proposes to conduct a series of experiments with advanced temperature and fluid measurement instrumentation (optical fibers, ultrasonic Doppler imaging, magnetic flow sensors, and hot wires) to obtain high fidelity data on thermal striping and thermal stratification in liquid sodium. To achieve this, a series of three different geometries will be considered both experimentally and computationally. The project will then use models to analyze low Prandtl number (sodium) heat transfer, thermal stratification and thermal striping experiments. Data from these simulations will be compared to the experiments and used to help understand the fundamental characteristics associated with the thermal stratification and striping mechanisms.

SECTION C. Environmental Aspects / Potential Sources of Impact

Chemical Use/Storage – The project will use 5 gallons of sodium metal within the flow loop with the EM pump. The sodium will not be consumed and will be stored on site after the project for continued work with regard to sodium fast reactors. The sodium needed is already on site, no new sodium is planned to be used. The University of Wisconsin has procedures in place to handle any waste that will be generated through this project. The action would not create additional environmental impacts above those already permitted at the university.

SECTION D. Determine the Level of Environmental Review (or Documentation) and Reference(s): Identify the applicable categorical exclusion from 10 CFR 1021, Appendix B, give the appropriate justification, and the approval date.

Note: For Categorical Exclusions (CXs) the proposed action must not: 1) threaten a violation of applicable statutory, regulatory, or permit requirements for environmental, safety, and health, including requirements of DOE orders; 2) require siting and construction or major expansion of waste storage, disposal, recovery, or treatment facilities; 3) disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; 4) adversely affect environmentally sensitive resources. In addition, no extraordinary circumstances related to the proposal exist which would affect the significance of the action, and the action is not "connected" nor "related" (40 CFR 1508.25(a)(1) and (2), respectively) to other actions with potentially or cumulatively significant impacts.

References: B3.6 Siting, construction, modification, operation, and decommissioning of facilities for small-scale research and development projects; conventional laboratory operations (such as preparation of chemical standards and sample analysis); and small-scale pilot projects (generally less than 2 years) frequently conducted to verify a concept before demonstration actions, provided that construction or modification would be within or contiguous to a previously disturbed or developed area (where active utilities and currently used roads are readily accessible). Not included in this category are demonstration actions, meaning actions that are undertaken at a scale to show whether a technology would be viable on a larger scale and suitable for commercial development.

Justification: The activity consists of university-scale research aimed at investigating thermal stratification, thermal striping, and neutronic and thermal-hydraulic coupling for low Prantl number fluids such as sodium.

Is the project funded by the American Recovery and Reinvestment Act of 2009 (Recovery Act) ☐ Yes ☒ No

Approved by Jack Depperschmidt, DOE-ID NEPA Compliance Officer on 09/06/2016